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Contingency Management for the Treatment of Stimulant Use Disorder

Delaware Stimulant Summit - March 30th, 2022

*Delaware Division of Substance Abuse and Mental Health, Workforce
Development and Education Unit*

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In Memoriam

This presentation is dedicated with enduring admiration and gratitude to the memory of Nancy M. Petry, Ph.D. (1968-2018).



Objectives

The participant will be able to:

- Describe the scope of the problem of stimulant use disorder.
- Differentiate the rationale and methods for Contingency Management (CM)
- Identify CM implementation challenges.
- Rebut common critiques of CM.
- Describe the evidence supporting CM effectiveness.

Stimulant Use Disorder: Methamphetamine as Exemplar

- A potent, highly addictive, schedule II, central nervous system stimulant. It's a dopamine reuptake inhibitor (like cocaine) and also increases the release of dopamine into the synapse.
- Derived from amphetamine, it's more potent and has longer-lasting effects (half-life is 12 hours vs. 1 hour for cocaine).
- Medicinally, it's sometimes used to treat attention deficit disorder, narcolepsy, and obesity.
- Most methamphetamine in the United States is produced by criminal organizations in Mexico. Sold relatively inexpensively and highly pure.
- Can be smoked, injected, snorted, or orally ingested. Latter two lead to euphoria; former two lead to a more intense but briefer "rush."
- Pattern of use often involves "binging and crashing" with lengthy binges referred to as "runs."



Crystal methamphetamine

Photo by

DEA/<https://www.dea.gov/galleries/drug-images/methamphetamine>

Regional Differences in the Drugs Most Frequently Involved in Drug Overdose Deaths: United States, 2017

by Holly Hedegaard, M.D., M.S.P.H., and Brigham A. Bastian, B.S., National Center for Health Statistics; James P. Trinidad, M.P.H., M.S., U.S. Food and Drug Administration; and Merianne Rose Spencer, M.P.H., and Margaret Warner, Ph.D., National Center for Health Statistics

Table A. Drugs most frequently involved in drug overdose deaths: United States, 2017

United States (<i>n</i> = 70,237, 21.7) ¹				
Rank ²	Referent drug group	Number of deaths	Percent ³	Age-adjusted rate ⁴
1	Fentanyl	27,299	38.9	8.7
2	Heroin	15,982	22.8	5.0
3	Cocaine	14,948	21.3	4.6
4	Methamphetamine	9,356	13.3	2.9
5	Alprazolam	6,647	9.5	2.1
6	Oxycodone	6,053	8.6	1.8
7	Morphine	4,874	6.9	1.5
8	Methadone	3,286	4.7	1.0
9	Hydrocodone	3,072	4.4	0.9
10	Diphenhydramine	2,286	3.3	0.7
11	Clonazepam	2,055	2.9	0.6
12	Diazepam	2,025	2.9	0.6
13	Gabapentin	1,848	2.6	0.6
14	Amphetamine	1,581	2.3	0.5
15	Itramadol	1,333	1.9	0.4

¹Number and age-adjusted rate (deaths per 100,000 standard population) for all drug overdose deaths. Age-adjusted death rates were calculated using the direct method and adjusted to the 2000 standard population.

²Drugs were ranked by number of deaths. Ranks were not tested for statistical significance.

³Percentage of drug overdose deaths that involve the referent drug group.

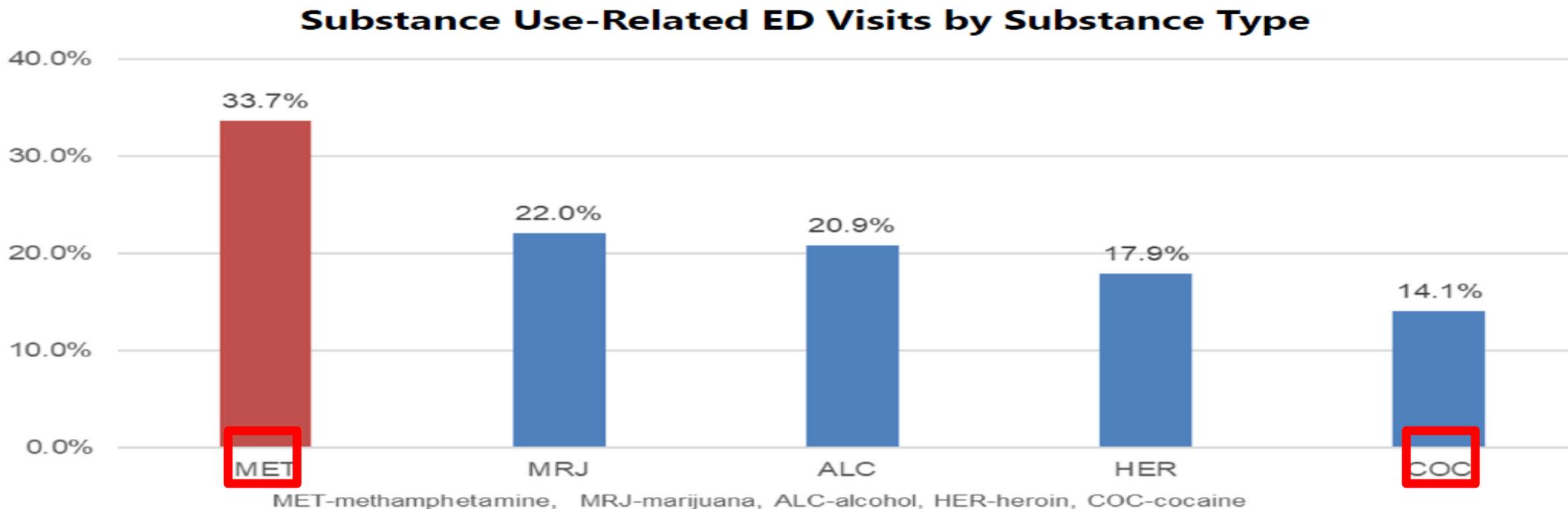
⁴Age-adjusted death rates (deaths per 100,000 standard population) were calculated using the direct method and adjusted to the 2000 standard population.

NOTES: Drug overdose deaths were identified using underlying cause-of-death codes X40–X44, X60–X64, X85, and Y10–Y14. Deaths may involve other drugs in addition to the referent drug group. Deaths involving more than one referent drug group (e.g., a death involving both heroin and cocaine) were counted in both totals. To avoid counting the same death multiple times, the numbers for drug-specific deaths should not be summated.

SOURCE: NCHS National Vital Statistics System, Mortality files linked with death certificate literal text, 2017.

Drug Abuse Warning Network (DAWN)

Data on substance-related Emergency Department (ED) visits from 50 non-Federal hospitals



This graph shows substance use-related ED visits by substance type, focusing on the most common illicit substances and alcohol. Methamphetamine (33.7%) was the most common type of substance involved in substance use-related ED visits.

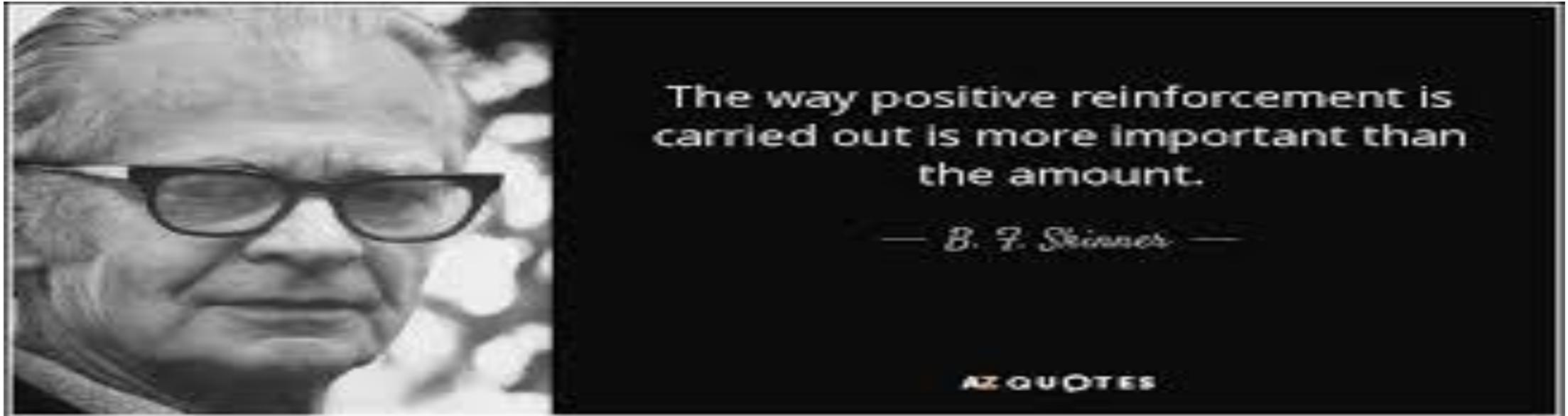
CM Makes Early Recovery Rewarding

- The reinforcements associated with substance use are immediate, reliable, and powerful.
- The reinforcements of recovery are powerful, but also are delayed & unreliable.
- CM brings immediate, reliable reinforcement for engaging in recovery-supportive behaviors, e.g. abstaining from substances, recovery activities, or medication adherence.
- CM engages patients in treatment and gives their brains a chance to heal.
- Reinforcing the target behavior provides de facto reinforcement of retention.

That sounds easy enough...

We reward patients for healthy behavior, right?

- Yes and No.
 - Yes, the concept is simple!
 - No, how one conducts CM makes all the difference in the world!



How does CM work?

- Select a specific, objective target behavior, e.g. abstinence.
- Measure the target behavior objectively and frequently.
- Provide immediate, tangible, desirable reinforcement when the target behavior occurs.
- Escalate the size of the reinforcement for consistent behavior.
- Withhold reinforcement when the target behavior does not occur.
- Re-set the size of the reinforcement for the next occurrence of the target behavior.

EVIDENCE-BASED CM PROTOCOLS

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The Voucher CM Protocol

- Patients earn vouchers of prescribed monetary value for completing recovery-supportive behavior, e.g. abstinence verified by a stimulant-negative drug test.
- Vouchers typically start at a minimum value, e.g. \$5 (Lussier et al, 2006, *Addiction*, 101, 192–203), and escalate by a set amount and schedule, e.g. \$1.25 (Petry, 2012, *CM for Substance Abuse Treatment*, New York: Routledge) for each consecutive negative sample.
- Reinforcement can be capped at a maximum voucher amount, e.g. \$20, and/or maximum cumulative earnings, e.g. \$500.
- Bonus values are optional, e.g. \$5 for every 4th consecutive negative sample.
- When abstinence is not confirmed, no voucher is earned and the value resets to the starting amount for the next negative sample.
- After resuming abstinence, the patient can return to the voucher level attained prior to testing not-negative without having to escalate as before, e.g. at the second consecutive negative sample following the reset.

The Prize CM Protocol

- Patients earn prizes of varying magnitude based on draws from a fishbowl.
- The fishbowl contains 500 prize slips:

250(50%) “Good Job!”	209(41.8%) “Small”=\$1
40 (8%) “Large”=\$20	1 (0.2%) “Jumbo”=\$100
- Draws start at 1 for the first negative sample and escalate (to a cap of ~8) with consistent abstinence.
- When abstinence is not verified, no draws are earned, and draws reset to 1 for the next negative sample.
- **Average cost per patient over 12 weeks is ~\$200.**

The CM Session

- Sample collected and tested.
 - Collections need not be observed; Testing need not include non-targeted drugs; Results must be available same-day and before the patient leaves the clinic.
- If applicable, discuss prior absence to determine if it's excused or unexcused.
- Briefly discuss any drug use and craving since prior CM session.
 - Although use of non-targeted drugs does not affect draws, be sure to discuss how it can undermine abstinence efforts on the target drug. Also ask how abstinence efforts with respect to the target drug can be applied to non-targeted drugs.
- Present test results and Award voucher/draws if the test result is negative for the target drug.
 - In Prize CM, all prize slips are returned to the bowl following draws.
- Ask about desired prizes.
 - Relate greater availability of the desired prizes to consistent abstinence and escalating draws.
- Issue CM Reminder Slip

Patient Eligibility for CM

- Diagnosis of stimulant use disorder.
- Do NOT require patients to provide a urine sample that is positive for the target substance lest you unintentionally incentivize use of that substance as a means of accessing CM.
- Generally, CM is a “one-and-done” treatment opportunity. However, second courses can be considered under the following circumstances:
 - 12 months has elapsed since the patient’s last session of CM.
 - The treatment team concludes that a second course of CM is a better option than an as-yet-untried SUD evidence-based treatment.
 - The treatment team has reason to believe that the second course of CM will have a better prognosis than the first course.

CM IMPLEMENTATION CONCERNS

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Implementation Concerns: Procedural

- Target Drug (Why not total abstinence?)
 - Most commonly stimulants, sometimes cannabis, soon alcohol?
 - Opioids? Medication for opioid use disorder (MOUD) remains the most effective, front-line treatment.
- Measuring abstinence? Toxicology testing with immediate results.
- Who administers CM?
- Type of reward?
- Frequency of sessions?
- Platform program? CM works with ALL forms of treatment and can be delivered in any setting.
- Contraindications?
 - (1) Medications that can produce false-positives for the target drug; (2) test results can be used punitively; (3) Received CM in past 12months.

Implementation Concerns: Organizational

- Budget Support for Incentives
- Implementing point-of-care drug testing
- Changing the clinical culture
- Training and Coaching
- Department of Health & Human Services - Office of Inspector General's Final Rule (12/02/2020)
- CM in the age of COVID: Telehealth-administered CM

CM in the COVID Era

- All the COVID precautions that apply to any behavioral health encounter should apply to CM as well, i.e. social distancing, masks, eye protection, gloves, hand sanitizing...
- Urine sample collection need not be observed, so social distancing can be accommodated in that process.
- Prize CM draws can be done one of three ways: (1) by the gloved provider in full view of the patient; (2) by the patient (gloved or sanitizing hands before and after draws) and in full view of the provider; (3) by the provider or patient using the newly available, Excel-based, electronic fishbowl (courtesy of T. Motoyama, Honolulu VAMC).
- Reinforcement can be disbursed while maintaining social distancing, i.e. provider places reinforcement on a table and backs away, patient retrieves it and backs away.

COMMON, UNDERSTANDABLE, REFUTABLE, CRITICISMS OF CM

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CM is Bribery

- One common critique against CM is that it is a form of bribery.
- However, CM does not even meet the definition of bribery let alone serve as an example of it.
- A bribe is typically the provision of a financial or otherwise material incentive to induce the recipient to behave in a manner (unethically and/or illegally) that benefits the payor (and can put both the payor and payee at risk).
- In the case of CM, the patient receives a reinforcer to strengthen a behavior, e.g. abstinence, that is in his/her own best interest, e.g. recovery from SUD.
- Furthermore, CM is an evidence-based treatment for SUD which can be a fatal illness.
- Withholding a life-saving treatment can be considered unethical and immoral.

CM is Paying People to Do What They Ought To Do

- Another common critique of CM is that we shouldn't "pay" people to do what they ought to be doing.
- As with the bribery critique, this critique is not even definitionally sound.
- When one "pays" another, the payor is compensating the payee for performing a behavior in the best interest of the payor.
- In CM, we reinforce the patient's behavior that is in the patient's best interest to perform, e.g. being abstinent.
- Furthermore, managed reinforcement contingencies are how we all learn.

CM Diminishes Internal Motivation for Recovery

- There is evidence that reinforcing high-interest, automatically-reinforcing behaviors, e.g. like solving puzzles, can diminish internal motivation – a concept known as the Overjustification Effect (Lepper et al., 1973, *JPSP*, 28(1), 129-137).
- The overwhelming majority of evidence on the effect of external reinforcement of behaviors like recovery from SUD has found that it does NOT reduce internal motivation (Promberger et al., 2013, *Health Psychology*, 32(9), 950-957; Litt et al., 2008, *Addiction*, 103(4), 638-648; Ledgerwood and Petry, 2006, *DAD*, 83, 65-72; Budney et al., 2000, *JCCP*, 74, 307-316; Eisenberg and Cameron, 1996, *Am Psychologist*, 51(11), 1153-1166).
- Furthermore, recent evidence from a meta-analysis of CM studies revealed that CM effects on abstinence were evident as long as 1 year after the CM ceased (Ginley et al, 2021, *JCCP*, 89(1), 58-71).

CM Effect Stops When You Stop CM

- Since SUD is a chronic illness and chronic illness symptoms can return when treatment ends, another critique of CM is that substance use behaviors will re-emerge when the CM ends.
- While this is possible, the aforementioned 2021 meta-analysis by Ginley and colleagues suggests that CM effects can endure rather than end when the CM ends.
- Furthermore, CM is among the most effective treatments for promoting lengthier periods of abstinence during treatment; and, we know that the longer the duration of abstinence during treatment, the greater the likelihood of long-term abstinence following treatment (Higgins, Badger, et al., 2000; Petry, Alessi et al., 2005; Petry, Martin, et al., 2005; Petry, Peirce, et al., 2005; Petry et al., 2007)
- CM reinforces the patient's efforts at living without the target substance and the longer that period, the greater the likelihood that the patient will begin to experience reinforcements aside from CM to sustain the recovery behavior.

Abstinence vs Harm Reduction

- Another philosophical objection to CM is based on the perception that CM is an Abstinence-Only approach to treatment and thus incompatible with Harm Reduction.
- However, the target behavior to be reinforced need not be abstinence (though that yields the strongest CM effect).
- Moreover, even when the target is Abstinence, CM is consistent with a Harm Reduction approach because:
 - It helps shape abstinence.
 - It provides reinforcement whenever the patient tests negative for the target substance (not based on a commitment to an abstinence goal).
 - The only penalty for not completing the target behavior is withholding and resetting reinforcement, not expulsion from treatment or other aversive consequences.

CM Patients will Divert Incentives to Support Substance Use

- CM involves the provision of items of value to patients with SUD (contingent on their recovery behavior), so it is possible that the patients will exchange or sell the incentives to support substance use.
- The risk of diversion of incentives is not as great as one might suspect. For example, Festinger and colleagues (2014, *JSAT*, 47(2), 168-174) found that even when awarded cash, CM patients show no increase in substance use compared to CM patients who receive non-cash incentives.
- CM procedures actually mitigate against this risk because the patient who uses the target substance will not receive reinforcement after testing positive. Furthermore, the patient also would experience a resetting of their reinforcement amount.
- In VA, the incentives that Veterans earn in CM come in the form of coupons that can be used to purchase goods from the Veterans Canteen Service (VCS; which operates the cafeterias, coffee shops, and retail stores (canteens) throughout VA. VCS offers a wide range of merchandise, e.g. from snacks and meals to clothing and higher-priced items including laptops and televisions. Furthermore, VCS does not sell items that might complicate recovery from SUD, e.g. tobacco products, alcoholic beverages, and gambling items such as lottery tickets.
- All that said, maintaining the security and accounting of incentives is absolutely necessary.
- Furthermore, maintaining integrity of the urine drug testing regime, adherence to proper CM procedures, and rigorous documentation of CM clinical practices will further mitigate any risk of diversion of incentives.

IMPLEMENTING CM: IS THE JUICE WORTH THE SQUEEZE?

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Abstinence CM Outcomes: The Empirical Literature

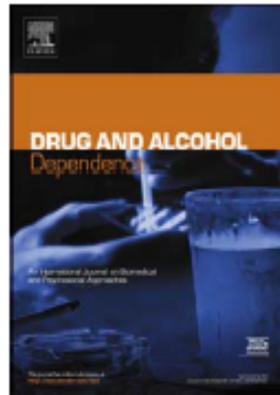
- Meta-analysis of 47 CM studies with treatment/control group design published between 1970-2002.
 - **Mean effect size =.42 (22% improvement in success rate).**
 - “Among the more effective approaches to promoting abstinence during the treatment of substance use disorders.”
 - **Prendergast et al., *Addiction*, 2006**
- Meta-analysis of 34 well-controlled studies of psychosocial SUD treatments (including CM, relapse prevention, CBT, and treatments combining CBT and CM) published between 1992-2004.
 - **Mean CM effect size =.58 (28% improvement in success rate).**
 - “The strongest effect was found for contingency management interventions.”
 - **Dutra et al., *American Journal of Psychiatry*, 2008**
- Meta-analysis of 23 randomized trials of CM, with 25 or more participants in each condition, that included evaluation of post-treatment outcomes, and were published in any year through July 2020.
 - **22% greater likelihood of abstinence at a median of 24 weeks post-treatment.**
 - “These results provide support of lasting benefits of CM after reinforcers have been discontinued using objective indices of drug use outcomes.”
 - **Ginley et al., *Journal of Consulting and Clinical Psychology*, 2021**



Contents lists available at [ScienceDirect](#)

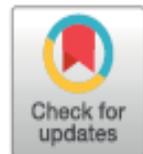
Drug and Alcohol Dependence

journal homepage: www.elsevier.com/locate/drugalcdp



Full length article

The national implementation of Contingency Management (CM) in the Department of Veterans Affairs: Attendance at CM sessions and substance use outcomes



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Published Outcomes of VA's CM Implementation: 2011-2015

- **Patient Enrollment in CM**
 - From June 2011 to December 2015, VA provided CM to 2060 Veterans in 94 SUD treatment programs.
- **Attendance Outcomes**
 - Fifty percent of CM patients completed 14 or more CM sessions in a 12-week period.
 - In comparison, Oliva et al. (2013; Psychiatr. Serv.) found that only 42% of VA patients with an outpatient SUD treatment episode completed more than two sessions of care in a one year period.
- **Substance Use Outcomes**
 - 91.9% of the 27,850 Veterans' urine samples tested negative for the target substance.

VA's Abstinence CM Implementation: Outcomes Through FY21

- 111 VA stations have made CM reinforcing abstinence available to Veterans pursuing recovery from substance use disorder.
- Over 5,700 Veterans have received Abstinence CM; and, 92% of the >73,000 urine samples have tested negative for the target drug(s), e.g. stimulants or cannabis!
- Regarding retention, the number of samples provided (73,656) divided by the number of Veterans who've received CM (5,711) is ~13 samples. Since CM involves twice-weekly sampling, the mean retention in treatment among CM patients is ~6.5 weeks.

CM is Effective Across Many Patient Populations

➤ Homeless:

- Tracy et al., 2007, *Am J Drug Alcohol Abuse*, 33(2), 253-258.

➤ People with serious mental illness:

- Murphy et al., 2015, *DAD*, 153, 293-299.

➤ Patients with PTSD:

- Mancino et al., *Am J Addict*, 2010; 19(2), 169-177.

➤ People with HIV disease:

- Petry et al., 2001, *JSAT*, 21(2), 89-96.

➤ Justice involved patients:

- DeFulio et al., 2013, *JSAT*, 45(1), 70-75.

➤ Veterans:

- DePhilippis et al., 2018, *DAD*, 185, 367-373.

➤ Patients on MOUD:

- Ainscough et al., 2017, *DAD*; Schottenfeld et al., 2005, *Am J Psychiatry*; Kosten et al., 2003, *DAD*.

➤ Across races*:

- Barry et al., 2009, *PAB*, 23(1), 168-174.

➤ Across sexes:

- Petry and Rash, 2015, *Exp Clin Psychopharmacol*, 23(5), 369-376.

➤ Pregnant women:

- Schottenfeld et al., 2011, *DAD*, 118(1) 48-55.

➤ LGBT community:

- Zajac et al., 2020, *PAB*, 34(1), 128-135
- Reback et al., 2019, *AIDS Behav*.

➤ Across income levels:

- Rash et al., 2009, *DAD*, 104(3), 249-253.

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Why implement CM? For at least 7 reasons...

- 1) **It's needed and it works!**
- 2) **It can be delivered by LIPs or non-LIPs!**
- 3) **It's brief!** Sessions can be completed in as little as 6-10 minutes.
- 4) **It's low-cost!** Effective CM costs an average of \$100-\$200 per month in incentives per patient.
- 5) **It can be combined with any other SUD treatment, e.g. medication, psychotherapy, self-help, etc.!**
- 6) **It's fun!** Prepare for smiles, shouts, and happy dances.

Thank you!

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